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LEADING ARTICLES

GLIMPSES OF EARLY ST. LOUIS MEDICAL HISTORY.*

CHAPTER III.

W. B. OUTTEN, M. D.

ST. LOUIS.

DR. CHARLES ALEXANDER POPE.

His reputation rooted stood in conscious worth,
His merits shone
In modest splendor, radiating from his true and good deeds done
Grandly generous by nature, courteous, a noble artisan,
He never knew envy nor pretense, he lived in truth a gentleman;
He walked in purity and strength and faith untiring, manly, valiant,
Attentive, steady, gracious, tender, held his honest soul as adamant.
He ever held his duties sacred, conscious of the worth within himself,
A larger fee than can be won from all a world of hoarded pelf,
For oft we find that wealth is but a splendid sorrow and it brings
No joy but only misery. It soothes less often than it stings.

Dr. Chas. Alexander Pope, born in Huntsville, Ala., March 15, 1818. His father, Benjamin S. Pope was a man of rare literary ability and was careful that his son should have the advantages of a complete education. Chas. A. Pope took a thorough academic course in the University of Alabama, where he graduated at an early age. Soon there-

NOTE.—Chapter I of this series, dealing with the life of Drs. Joseph Nash McDowell and M. A. Pallen appeared in the Medical Fortnightly, March 25, 1908; Drs. Adam Hammer and M. L. Linton, April 10th; John T. Hodgen, April 25th.

after he began the study of medicine, attracted by the well deserved reputation of Dr. Daniel Drake as a teacher and lecturer, he attended his first course of lectures at the Cincinnati Medical College. From Cincinnati he went to Philadelphia and entered the University of Pennsylvania. He received his degree of M. D. in the spring of 1839, when he was just 21 years of age. The French School of Medicine at this time being the most celebrated in all Europe, Dr. Pope immediately after graduating went to Paris and for two years he devoted himself untiringly and industriously to the study of surgery. Besides the Continental schools he attended those of Great Britain and Ireland. On returning from Europe he settled in St. Louis in 1842. His studious habits, urbane manner and high moral qualities made him a man of mark in his profession. His earlier years were of uninterrupted progress. In 1843 he was chosen Professor of Anatomy in St. Louis Medical College, then the Medical Department of the St. Louis University. In 1846 he married Miss Caroline O'Fallon, the only daughter of Col. John O'Fallon. In 1847 he became Professor of Surgery in St. Louis Medical College. His father-in-law, Col. John O'Fallon, erected a large and handsome building known as the St. Louis Medical College, as a tribute to the merit of his distinguished son-in-law. In 1854 he had the high honor conferred upon him by being elected President of the American Medical Association at its meeting in Philadelphia. There are two elements which more or less predominate almost every medical student's mind, and they are fancy and ideal. Review your student fancies and you will find that there are few things in, on or about this universe of ours which they have missed, but then fancy is that toothless stage of the imagination, a regular hoodlum in tendency and with a productivity not to be outdone even by the tubercle bacillus. As to the student's ideals they are generally constructed upon something tangible, something that is living and breathing, and something that has had success. A student in his ideals is not inclined to build gods of fire and wonder why they burn, nor does he imitate Sir Walter Scott, idealist, who built statues of snow to weep when they melt. No indeed, the student builds his ideals on something which is full of substance which is strong and worthful, even though at times they be little wicked.

I doubt if there ever was a student in the St. Louis Medical College during the dean and professorship of Dr. Chas. A. Pope who did not think that if he could attain a position similar to Dr. Chas. A. Pope's that then he would indeed have attained all that any sensible man should desire or hope. Dr. Pope certainly had a most impressive presence. He was a little above the average height with a well-sized and well-shaped head. His black hair and whiskers were scrupulously kept and set off his well-chiselled and regular features. His eyes were well opened, frank, expressive eyes. He had a thoroughly proportioned body, and moved with defined ease and grace, which could only come through a harmoniously attuned and cultured mind. He was always thoroughly and completely at ease, his politeness was instantaneously and always manifest, unstrained and natural in every movement and action. He flattered you by his seemingly unconscious, elegant solicitude, and his general bearing at no time suggested that there was a single insincere element about him. He was strong, grave, well balanced and manly. He was indeed a natural born admirable gentleman.

As a lecturer he was painstaking and systematic, with somewhat of a snappy way of utterance. His generalizations while never very extensive were always well timed. He plainly favored the French school of medicine. To him Velpeau was the greatest of all surgeons whose remarkable diagnostic ability had made him the unexcelled and the unapproached. The doctor had rare self-command, for he seemingly kept his enthusiasm well under the leash and no declamatory period ever threw him into the fine frenzy of oratory. His system was excellent and his quiz work effective, always too much of a gentleman to push his questions so as to make any student humiliated. As a diagnostician he stood well, because he was painstaking, cautious and strikingly conscientious. As an operator he was unusually efficient and wonderfully dexterous. He had the most graceful manner in handling an instrument of any surgeon that I ever saw. Every motion made by his scalpel was the very poetry of motion.

From 1863 to 1866 the St. Louis Medical College was filled with a large class of eager, industrious and enthusiastic students, many of whom had returned from the war either upon the Union side, or from the Southern army. They indeed were rich in such experience as war gives, they had an immense amount of civility, begot by the struggle between a proud mind and an empty pocket-book. For many of them found that it would

really have been less difficult to completely hide Mark Twain's million pound bill better than they could a hole or patch in their old butternut or blue coats. They were a strong virile and energetic crowd of young men, and became especially well up in Anatomy, Physiology, Chemistry and Materia Medica. Indeed, such was the enthusiasm in the study of anatomy that it was no unusual thing for the student classes to remain in the dissecting room until 2 or 3 o'clock in the morning. Heavens! what constitutions these young men must have had, for they would work in a dark, dirty and saw-dust covered room filled with odors stronger than the thews of Sampson. The odors of this dissecting room had fulness and variety, more than one student realized that nothing could equal the accuracy and measured purposed of these odors, for they invariably got to the nose, and they found these odors were fretful things and had their wings always spread for flight. It was an undoubted fact that the students of this college became so impregnated as to give forth emanations so strong as to make many worthy persons in their immediate vicinity point their noses heavenward, retard inhalation, and hasten away to seek contact with odors less insolent and despotic. It was no unusual thing to have from three to ten students of this college, a session, suffer from some low form of fever.

Among the professors none received more respect or obtained higher regard than Dr. Pope. He was very popular, his operations were deemed by the students as superior to the surgeons then practising in St. Louis. When he left St. Louis to go to Paris it was regretted upon all sides, and each graduate of the college felt that it had lost one of its most valued professors. His clinics at the old Sisters' Hospital (or Mullanphy Hospital, as it is called now,) situated at Fourth and Myrtle streets, were always well attended. The clinics were not very extensive, but they all had an excellent variety, and the lateral operation for lithotomy was especially frequent, and I doubt if any surgeon ever performed this operation more gracefully than Dr. Chas. A. Pope. In the clinic he made an admirable teacher, giving plain directions, describing technique and instruments unusually well.

Scharf in his history of St. Louis and St. Louis County, says: "Dr. Pope continued in diligent practice, but in 1855, yielding to the solicitation of his family he resigned his professorship and gave up his large practice with a view of spending a few years in Europe. In 1870 he returned to St. Louis on a visit when such a reception was

given him as is rarely accorded to any one. The whole city as it were rose up to do him honor, and his entire visit was one continuous ovation. He returned however, to Paris to join his family, but scarce had tidings of his arrival been received before the whole city was startled by the announcement of his sudden and unexpected death, which occurred in the City of Paris, July 5, 1870, in the 52d year of his age."

I can very well remember his return to St. Louis, for the members of the faculty of the St. Louis College of Physicians and Surgeons had a meeting to do him honor. This college was then just starting and had been organized by Prof. L. A. Bauer, of Brooklyn, and the faculty was composed of such men as M. A. Pallen, A. S. Barnes, T. F. Prewitt, J. K. Bauduy, John Green, A. J. Steele, W. L. Barrett, J. M. Scott, LeGrand B. Atwood, the writer, and others. I can remember how he expressed the great pleasure in seeing a new educational institution started in St. Louis. He assured these gentlemen that to obtain success constant and unremitting labor was necessary, and if individual worth was a criterion of success he was sure the new college would attain it. His words were full of kindness evincing a sincere desire upon his part that this college would succeed. When word came of his death it was distinctly a shock, not only to all of his former students, but to his innumerable friends everywhere. Profound regret became almost mystifying sorrow, when it was learned that he had immolated self. Was this the logic of an accurate mind gone wrong by worry, or was it when "with curious art the brain too finely wrought preys on itself and is destroyed by thought?"

No man in the medical profession of St. Louis ever attained more gracious regard and higher veneration upon the part of the laity and medical profession than Dr. Pope. In this man's life not a single unethical act had ever occurred, nor had he ever been known to speak wrongly of any one. It was his to forebear, to judge, he let others think wrongly if they would, but not for him. A man of exemplary moral character. The writer of this some years ago painted a very poor picture of Dr. Pope and presented it to the St. Louis Medical Society. He hopes that he will be excused for quoting what he said in 1896: "Chas. A. Pope taught his every student that reverence was an ennobling sentiment, that appreciation was indeed a rare invigorant. Oh, how many has he taught and trained in classical medical lore the histories of medical heroes and aroused in every mind a longing ambition to attain that period when some one might laud and appre-

ciate them in splendid loyal tones like his. Aye, indeed he was a true prototype of the first surgeon of his time in the Mississippi Valley, a model as I saw him, manly, noble and earnest, who at all times inspired and elevated. He aroused dormant ambitions and pointed to lofty ideals for example and copy, progressive, honorable, too much of a student, to waste his time in ceremony and criticism. His was a life whose force came from a loyal devotion to his calling. He never knew but one course and that was to elevate; a builder was he, a constructor of character, never a grumbler, or despoiler. He left the world better for his having been in it; he made surgery to his student a grand and respected art; he evolved graceful effects; the master of harmony and result, and worked upon the human body with all the grace and care of an honest and inspired devotee to a grand and noble calling. He held his knife with the hand of a master, and never at any time did it appear but there was a preordained combination formed for the purpose of good and cure. Never at any time when Chas. A. Pope held an instrument for operative procedure but that he looked the ideal surgeon. No flippant thought dare assail the mind of his students, but every motion indicated strength, efficiency and the perfection of surgical art. I say here that Dr. Pope left upon the minds of the students of the Mississippi Valley a deep and lasting impress of the true and honorable function of surgery, truly more so than any man heretofore coming into this region. Step by step he enlarged his sphere and enlarged the best moral element existing in the mind of his students, and its impress still remains. His high moral standard was ever constantly indicated in word and deed. No sordid element ever determined the hazard of an operation for him. The human body was truly divine and he approached it in operative procedure in grave and respectful awe. My memory comes from thirty-two years ago, they are the remembrances of youth enriched by age and experience; they have made me through my professional life rich in feeling, in kindly graceful thought; they are mine with all of their enthusiasm, appreciation and imperfection. I ask all who knew him as I did to share them with me, but for that one who dares assail and rob me of them I say, "God forbid." I know too well the force and worth of his rare function."

At this meeting the late Dr. Pollock in his chatty, nervous way, cited the fact that Dr. Pope would not perform over two or three operations a day.

The surgery of forty-two years ago was indeed as different from the surgery of today

as could be well imagined. Then it was surrounded upon all sides with difficulties and tragedies. Septic troubles and all of their attendant horrors marked the course of almost every operation. Prognosis in those days was the most treacherous of a surgeon's functions and was as uncertain as a cheating lottery. Yes, forty years ago surgery was an imperious mistress which required the whole heart and life of a man. It required a strong and powerful nature to follow the art of surgery. Then a man had to be strong and powerful mentally and physically, because surgical treatment with so many dangerous and uncertain conditions that they required men who could stand the by-play of tragedy and a multitudinous number of unseen and unpreventable troubles. Cure in those days, say in compound fractures, when the white fibrous tissues were always angular with menace, meant either amputation, deformity, or from the immense pus discharge, the engrafting of some incurable kidney trouble.

But as to the assertion of Dr. Pollock, the writer knows that this was not the absolute truth. It might have been true that Dr. Pope could not have performed a dozen lithotomies a day, but then he had to perform operations in almost every direction, and performed a great majority of cataract and other operations for Dr. Pollock.

Thank God the noble art of medicine is replete with men of culture! conscientious and noble apostles of God's Golden Rule, with passion for doing the good and true, reverencing the right as part of God and man's best wisdom. The old physician as well as the new practiced the Christianity of humanity, and no men were and are any more self-abnegating, none were and are more charitable, nor have or do now follow out more loyally, devotedly and practically, the true and worthy spirit of the Master than the doctor of the past and of today.

"Whether in Naisapur or Babylon,
Whether the Cup with sweet or bitter run,
The Wine of Life keeps oozing drop by drop—
The leaves of Life keep falling one by one.

"Ah! make the most of what we yet may spend
Before we, too, into Dust descend.
Dust into Dust and under Dust to lie
Sans Wine, sans Song, sans Singer and sans End."
—Omar Khayyam (Edward Fitzgerald). ☐

AN ANTITUBERCULOSIS LEAGUE has been organized in Lawrence, Mass. Antispitting signs have been placed about the town by the board of health and an effort will be made to keep the streets cleaner. A class for instruction in the cause and prevention of tuberculosis has been formed which meets once a week. The league is planning to establish a day camp in the near future.

SELECTED ARTICLE

THE AUTO PROTECTIVE RESOURCES OF THE BODY—A NEW FOUNDATION FOR SCIENTIFIC THERAPEUTICS.*

CHARLES E. DE M. SAJOURS, M. D.

PHILADELPHIA.

IN acknowledging the honor your Executive Committee has conferred upon me by inviting me to address you this evening, Mr. President and Gentlemen, I must apologize for the many allusions to personal investigations that my remarks will contain. The reason for this seeming selfishness is readily accounted for: your committee believed that the newer conception of pharmacodynamics I have to offer, might prove of some interest not only to the members of the Therapeutic Society, but also to those of the pharmaceutical profession whom it gives us pleasure to welcome this evening.

Prof. John H. Musser, in a paper published three years ago in the American Journal of Pharmacy, stated that "just as the present compares with twenty years ago, one can see less and less of the use of drugs." While predicating from this deduction that twenty years hence "a minimum of drugs" would be used, he cited broncho-pneumonia and tuberculosis as examples of the value of rest, fresh air, and proper food. Sir Frederick Treves more recently gave vent to similar views; while recognizing that "the habit of taking medicines lies deep down in the hearts of the people," he too thought that the use of drugs would "be replaced by simple living, suitable diet, plenty of sun, and plenty of fresh air." Similar conclusions are often published by men of high standing. And yet can they, in truth, dispense with drugs? No experienced practitioner will deny that nine-tenths of our professional usefulness is based on pharmaceutical remedies. Not only do our patients crave active, militant protection and relief in the hour of suffering, but the physician knows through the teaching of practical experience that drugs are his legitimate and often trustworthy weapons of warfare, the strongest shield he has to interpose between his patients and the fell destroyer.

Closely allied to the air, food, and water apostles are the therapeutic nihilists who like, Professor Osler, believe in the doctrine of self-limited diseases and look on while Nature and the disease have it out. Dr. Abra-

*Read by invitation before the American Therapeutic Society and the Philadelphia Branch of the American Pharmaceutical Association, May 7, 1908. Reprinted from the Monthly Cyclopedic of Practical Medicine.

ham Jacobi who, in accord with the great bulk of the profession, considers expectancy as a synonym for loss of time and opportunity, characterizes this nihilistic attitude as a compound of ignorance and indolence, and as "a sin of omission which frequently arises to the dignity of a crime." Emphasizing, moreover, the truth of Dixon's doctrine that the tendency of all diseases is toward death, he urges—and sustains by illustrative cases—that lack of timely treatment is accountable for much loss of life. Indeed, we blame, and our courts sometimes punish mystic therapeutists, Christian scientists, etc., for similar reasons, and it becomes a question whether their attempt to afford some help does not exonerate them in the presence of our own therapeutic pessimists who supply nothing—except, perhaps a correct death certificate if the patient happens to die.

Another most regrettable feature of present-day medicine is that public confidence in our professional efficiency is on the wane, as the frequent attacks in the lay press well attest. Disregarding totally the many sides of our professional work which should command appreciation, the incalculable benefits that thousands of noble and self-sacrificing men have bestowed upon humanity, many people who, in the moment of danger, at once seek our aid are not loathe to lapidate us when the occasion offers. Other countries, even the great European centers of learning, are equally militant. Thus, Professor Dieulafoy, of Paris, declared only a few months ago, that medical men are criticised on all sides; in public, in the drawing room, at dinner parties, on the stage, in the newspapers, etc., and that books, even, are written expressly to condemn the medical profession! The normal results of this campaign are that a multitude of innocent people are increasingly driven into the hands of quacks; that systems of practice based on mysticism and misrepresentation are steadily gaining ground, and that patient medicine vendors are accumulating untold wealth at the expense of the unwary.

What is the underlying cause of all this. An analysis of the causes of defection in our ranks is, I believe, first in order. Indeed, as stated by Llewellys F. Barker in 1900, at the close of a century during which all sciences other than medicine had advanced at an amazing pace: "With many, pharmacotherapy, as a whole, is almost moribund."

Shall we, however, with Dr. Jacobi and other distinguished men of our profession, ascribe to ignorance the loss of confidence in remedies that some of its members betray? What physician would presume to assert that mercury in syphilis, quinine in malaria, iron

in simple anemia, arsenic in pernicious anemia, thyroid extract in cretinism and myxedema, antitoxin in diphtheria, digitalis in certain cardiac disorders, sodium salicylate in muscular rheumatism, strychnine in adynamia, and many other remedies I could cite, are useless? And yet, Dr. Frank Billings wrote, in 1903, that "drugs, with the exception of quinine in malaria, and mercury in syphilis, are valueless as cures;" in 1907 these last vestiges of our glory must have vanished, for the president of a prominent British society, Dr. A. H. Brampton, took occasion to say, as a prelude to a personal expression of dissent: "Skepticism is in the air. Even in this society, if any daring member has introduced a subject bearing on medical treatment, it has been with an apologetic air and humble *mein*, well knowing that if his remarks had any reference to the utility of drugs in the treatment of disease, they would be subject to good-humored banter, and received by those sitting in the seat of the scornful with amused incredulity." May we not be dealing with an unwarranted prejudice against drugs rather than with ignorance? Again is it not among the best informed men of our profession that drug-nihilism prevails pre-eminently?

It should be attributed, it seems to me, to an entirely different cause—one, indeed, which is increasingly making itself felt from day to day. Bichat said over a century ago, "pharmacology in its present state, is not a science fit for a methodic mind." Notwithstanding the enormous painstaking labor that has been devoted to the multitude of problems it offers, Bichat's estimate is still applicable—a fact emphasized by the oft repeated admission that therapeutics has not raised itself above the level of empiricism.

We all know, for example, that mercury is curative in syphilis; but how is this accomplished? This, as Manquat asserts in the last edition of his *Therapeutics*, "is impossible to say." Another mainstay in many diseases is iodine, not only the haloid proper, but its salts. Hare writes: "The physiological action of iodine, so far as its alterative powers are concerned, is absolutely unknown." The brightest star of late-date therapeutics, antitoxin, stands not a whit higher. H. C. Wood, after reviewing the more familiar theories of its action, including Ehrlich's theory, says: "It must be confessed that we have no positive knowledge of the manner in which this substance acts in infectious diseases." Another truly wonderful agent—particularly in myxoedema and cretinism—is thyroid extract, but, as to its mode of action Lauline tells us that "for the time being there is not even a clue to the so-

lution of this problem." As to digitalis, H. C. Wood, Sr. and Jr., write: "In our experiments upon the exposed mammalian heart, we have seen the final acts of digitalis drama happenings so curious that at present no proposed theory as to the action of the drug is sufficient." This obscurity applies more or less to all drugs administered internally.

On the whole pharmacology, which, as shown by Bichat's contemptuous remark, was in a deplorable condition early last century, was still, at its close, notwithstanding an enormous aggregate of sound scientific facts contributed by a host of brilliant scientists, "in a backward and unsatisfactory condition," as a great clinician, Sir Andrew Clark, once expressed it. Indeed, no one can deny that it has failed to keep pace with the other branches of medicine: diagnosis, physiological chemistry, histology, etc., which have steadily gained for themselves a place among the medical sciences. Although the most important of all, and the one branch through which the public, the whole world, in fact, gauges our actual professional efficiency, therapeutics has ever remained a mere art. A remedy is still given because it has been found more or less efficacious in this or that condition by others, and the subdivisions headed "treatment" or "therapeutics" in our text-books are mere catalogues of drugs which are stated to be "particularly useful most efficient" "very valuable," "commonly employed," "of great value" etc., in this or that disease, and in which not an inkling is afforded as to how the remedy antagonizes the morbid process. Not only does this entail a source of error at every step, since it often happens that a drug indicated in one stage of the disease may be contra-indicated in another, but it leaves the conscientious physician in constant anxiety lest the agent prescribed empirically prove more harmful than beneficial. Hence the frequent, sometimes daily, change of remedies—to which shelves covered with pill boxes and small bottles attest—and, I may add, the ill-repute into which therapeutics has fallen.

Need we wonder that highly trained men, who have developed great keenness as diagnosticians and the highest attainable proficiency in pathological histology and chemistry, have lost faith in pharmacotherapy? Are we justified in attributing to ignorance their loss of faith in a system of administering remedies which is as irrational and archaic as the other departments of medicine are precise and modern? Indeed, it is merely because pharmacotherapy has not kept pace with the immense strides of all other branches

that it is, with many physicians, as stated, by Prof. Llewellys F. Barker, "almost moribund."

Next in order is the cause of this deplorable condition of therapeutics. Must we attribute it to the host of investigators in pharmacodynamics to whom I have referred? Even though experimental errors to which I will allude presently, might have delayed progress, I firmly believe that if there had not been insuperable obstacles in another direction, therapeutics would stand today among the most advanced medical sciences as a result of their labors. One of their number, the foremost sponsor of experimental therapeutics of our day, Horatio C. Wood, Sr., of our own city, and several equally eminent foreign colleagues, would long ago have given us a sound foundation for the intelligent use of drugs had their deductive reasoning not been handicapped at every step, by a feature of the question to which I called attention last year: the short comings of physiology.

To interpret intelligently the physiological action of alteratives and tonics, which are in daily use by physicians, for example, an accurate knowledge of general metabolism, the foundation of nutrition, is necessary. What is known on this subject, according to the late Sir Michael Foster, "consists mostly of guesses and gaps." The action of cardiac stimulants includes as main phenomenon slowing of the heart through the mechanism of inhibition. Physiologists, according to Langley, "are still far from any real knowledge of the processes involved in inhibition." Diaphoretics and sialagogues activate the sweat and salivary glands by causing vasodilation in these organs. As Chapman says: "Though numerous explanations have been offered of the manner in which the vasodilator nerves act, it must be admitted that none of them are satisfactory." The study of hypnotics and anesthetics presupposes a knowledge of the process through which sleep is produced. According to Bradbury "the phenomenon is still enveloped in mystery." Analgesics and nerve sedatives and stimulants owe their action to modifications in the character of the impulses awakened in the nerves; but as Stewart says, "what the nerve-impulse actually consists in we do not know." This factor is intimately linked, in the action of antispasmodics and convulsivants, with muscular oxidation, but Laulanié writes "we are absolutely ignorant of the mechanism of organic oxidation." Purgatives, whether their effects be due to an increase of secretory or peristaltic activity evoke them through secretory or motor nerve-paths; but, as Langley states, the rela-

tion of the enteric nervous system to the cranial nerves "is at present a matter of guess-work." Emetics suggest the need of adequate knowledge of the process of vomiting, but, according to Foster, "the nervous mechanism of vomiting is complicated and in many respects obscure." To explain the action of diuretics the mechanism through which the secretion of urine is governed should be known; "as yet," writes Landois, "only the influence of the vasomotor nerves upon the filtration of the urine from the renal vessels is known"—which means that that of the secretory nerves is not.

In brief, every important subdivision of therapeutics thus finds itself deprived of the essential physiological knowledge upon which a rational explanation of its physiological action could be poised. And this does not apply to therapeutics only; pathology is suffering, and has suffered, all along from the same cause, since, after all, the morbid effects of bacterial toxins or endotoxins, poisons, toxic wastes, etc., act in the body as would poisonous doses of drugs persistently administered.

Is there any indication that physiologists will furnish the data we need to place pharmacology on the sound basis we so earnestly crave I must frankly express the belief that, judging from present indications, the prospects are very discouraging. In the first place a cursory glance through physiological literature shows that they devote very little work to the study of the physiological problems I have enumerated. In the second place they overlook the one source of information through which their own labors could be made promptly to bear fruit: that covered by the assertions of a great Russian physiologist, Professor Pawlow, that in many instances "the physician gives a more correct verdict concerning physiological processes than the physiologist himself," and that "clinical observation will consequently always remain a rich mine of physiological facts." In the third place I greatly regret to say that they are steadily deserting us. A physiologist, Dr. Meltzer, wrote, a few years ago: "Physiology is of medical parentage, was reared by medical men, and is still housed and fed by medical faculties. Still it is medicine against which its frequent declaration of independence is directed. Medicine is a practical science, and is too inexact, and physiology wishes to be a pure, exact science. It, therefore, tries to keep aloof from medicine, and manifests a longing for association with, or, better still, for a reduction to physics and chemistry." Time has only served to sustain this statement and to emphasize my own conviction that medicine,

and particularly pharmacology, will not be redeemed from its present deplorable position as long as it will depend entirely upon physiologists for the elucidation of function.

This is not intended to mean that pharmacologists are not also open to criticism. But their short comings cannot be ascribed to a lack of effort on their part to elucidate the multitude of problems they are expected to solve; they are due, in my opinion, to errors of procedure and of interpretation in the course of their experimental work.

First among these is the belief that drugs given by the mouth, injected hypodermically or rectally, travel to the tissues and act upon them. Text-books tell us, for instance, that digitalis excites directly the muscular fibers of the heart, and that the rise of blood-pressure and increase of pulse-volume are mainly due to the greater propulsive power with which the drug endows this organ. This is based on experiments in which the heart, partially or entirely detached from the animal, is caused to resume its beats by dropping upon it a solution of digitalin. That this experiment is misleading is suggested by various facts. The weakest solution that will act directly on the heart thus exposed is 1 part in 50,000. Now, a large therapeutic dose of digitalin by the mouth is $\frac{1}{4}$ grain which, dissolved in the blood-mass, would make a solution four times weaker: 1 to 200,000. Hypodermically 1-16 grain of digitalin produces distinct physiological effects, and yet this is only a solution of 1 to 800,000 in the blood-mass—a solution sixteen times weaker than is absolutely necessary to influence the exposed heart experimentally. The prevailing belief in this connection becomes absurd when to these figures we add the facts that the drug is chemically modified in the blood—when given orally, hypodermically, or rectally—long before it can reach the heart-muscle at all, and that a large proportion of the blood is constantly passing out into the lymph-spaces and vessels, thus necessarily carrying a correspondingly great proportion of the drug with it. Again, why is it, if digitalis acts directly on the heart, that it affects much more actively the right side of this organ than the left? If the blood carried it to the heart-muscle, both sides should be influenced similarly. Another suggestive fact is that division of the spinal cord prevents the effects of digitalis given internally; obviously if the drug acted directly on the heart-muscle, this procedure would not prevent its action. Need we wonder that H. C. Wood, Sr. and Jr., can still say in the last edition of their *Therapeutics* that "at present no proposed theory as to the action of the drug is sufficient"?

There is ample experimental and clinical evidence to show that it is upon the general nerve centers that the vast majority of our drugs act, and that the phenomena witnessed are those awakened by these centers or resulting from diminution or arrest of their function activity. As stated by Prof. Charles Richet, of Paris, "all toxics (with rare exceptions) are hardly poisonous otherwise than through their action upon the nerve-cell. In the organism," adds this distinguished physiologist, "the nerve-cell, to the detriment of other cells: muscular, glandular, epithelial, is the most sensitive to toxic action." Such being the case, the most sensitive nerve-cells, those of nerve centers, are the first to feel the influence of the small doses of toxic that our remedies represent, and it is because of this that such a minute dose of aconitine as 1-400 grain, for example can depress the whole circulation, and cause muscular torpor and weakness and also, perhaps, tingling in the extremities.

A second experimental error which proves misleading in most instances is the use of anesthetics in animals in which a remedy is tried. Ergot, for instance, has been regarded as a vaso-constrictor since its action had been at all seriously studied, when certain investigators, basing their assertion on hundreds of experiments, declared that this agent did not cause vascular contraction. But an examination of their work revealed that they used ether as anesthetic, an agent which, as is well known, is a powerful vaso-constrictor. How could they possibly cause contraction of the vessels with ergot when these blood-channels were already contracted to their utmost limit by the ether?

A third source of error, one which prevents progress in our knowledge of the action of drugs that affect the cardio-vascular system, is the neglect of waste products as factors in the process. Although *veratrum viride*, for instance, has long been considered a powerful vaso-dilator, capable of causing the blood to accumulate in the deep and large vessels, thus depleting congested organs, recent experiments have suggested that this drug in reality constricts the arteries. But analysis of these experiments shows that the older view is the correct one, and that the vaso-constriction witnessed by the experimenters was not due to the drug. The large dose used had produced so intense a vascular dilation that catabolism of waste-products in the peripheral capillaries had been inhibited; and these wastes being, as is now well known, powerful vaso-constrictors, they overcame the vaso-dilator action of the *veratrum viride* and produced vaso-constriction.

A fourth and very misleading error is the

experimental use of excessive doses in animals to determine the action of a remedy. In a recently reported study of the therapeutic action of potassium iodide, for example, the investigator administered to his animals doses which in man would represent 346 grains! The effects produced by such doses not only fail to exemplify the therapeutic action of the drug; they are those of intoxication. As stated by Hale White, "when a drug in moderate doses excites a function, in large doses it often paralyzes it." This applies to a large proportion of the experiments on record, and it is to this fact that the resent ignorance of their physiological action must, in great part, be ascribed.

A fifth cause of confusion is the belief that because certain drugs, atropine, for example, paralyze nerve endings by acting directly upon them when locally applied, it produces the same effect through a similar process when given hypodermically or orally. If the smallest dose that will evoke a physiological effect when given internally, is used to prepare a solution with the entire blood and lymph (in which the drug also circulates of a control animal of equal weight, it will be found inert; first, because the solution obtained is entirely too weak, and second, because it is chemically altered by the blood's antitoxic constituents. In the living animal, and particularly in the carnivora, this latter process is far more active than in shed blood, to such a degree in fact that blood drawn from an animal treated to a dose capable of producing marked physiological effects will prove inactive. The physiologists are the principal victims of this class of error—which applies to other alkaloids: pilocarpine, muscarine, nicotine, etc., employed by them, and many conclusions regarded by these scientists as sound are in reality defective and, therefore misleading.

The sixth and last source of error I will submit is one which doubtless has cost many lives, namely: The assumption that certain phenomena produced by drugs are manifestations of a normal function. Digitalis, for example, is said to slow the heart by stimulating the vagus; that is to say, the mechanism of inhibition—a supposedly physiological function. But there is no ground for this assumption. In the first place, as Porter says, "the nature of the terminal apparatus by which the vagus inhibits the heart is unknown." In the second place, the coronaries and other arteries of the heart, contrary to what physiologists teach, are supplied with vasomotor nerves, as shown by microphotographs of these nerves in my work on the "Internal Secretions." Now, ample evidence is available to show that all

the drugs which slow the heart do so partly by causing constriction of these cardiac arteries; that is to say, by reducing the volume of blood supplied to the heart wall. We are not witnessing a normal phenomenon, therefore, when under the influence of large doses of various cardiants the heart is slowed, but a morbid effect: weakening of the heart muscle, a factor to which the increased resistance of the general arterial system to the heart's contractions adds a cause of cardiac arrest.

Other examples could be submitted, but these will suffice, with the shortcomings of physiology previously enumerated, to suggest why therapeutics has failed to keep pace with the other branches of medical science; why, in other words, as Professor Sollmann, a medical member of the Council of Pharmacy of the American Medical Association, could write, regretfully doubtless, only last month: "A generation ago therapeutics was an art, promising to develop into a science. At present it cannot be classed as an art, nor as a science; it can only be classed as a confusion."

Need I further urge that new and more fruitful lines of thought are imperatively needed if the true worth of our profession, its humane purpose, and its very existence are to be perpetuated?

I believe that it is fully within our power as pharmacologists to remedy the prevailing state of things and to raise therapeutics to the dignity of a science. At no time in the history of the world has medicine been richer in solidly grounded experimental and clinical facts, precisely those we need to attain this most ambitious of our aims. We hear much of empiricism, the stigma of medicine as an art, but as Huxley once said: "All true science begins with empiricism, through all true science is such exactly in so far as it strives to pass out of the empirical stage." With the means now at our disposal we need only to strive, to eliminate forever our escutcheon the blemish that "empiricism" implies. Hosts of workers, those to whom Oliver Wendell Holmes referred when he wrote

"Blest is he who knows no meaner strife
Than Art's long struggle with the foes of life."

have lived a life of devotion to suffering mankind. They may not have left us as heritage a therapeutic structure, or even the foundation for one, but they have furnished the hewn stones out of which it can be erected. It is for us to build. We may speak of confusion today; but confusion likewise prevails before each pillar, each stone, of any great edifice has found the place assigned to it by the co-ordinating mind of the architect.

Therapeutics needs architects and builders today far more than it does experimenters; and when that fact will be thoroughly apprehended a new era for medicine as a whole will begin; one that will ultimately lead to the highest of human accomplishments the mastery of disease in all its forms.

It is the result of an effort in this direction, begun some twenty years ago that I am about to outline. Therapeutics may not exist as a science, but a close scrutiny of all the branches of knowledge related to medicine convinced me that with the many sources of error, physiological and pharmacological, I have submitted, once overcome, the aggregate of sound scientific data at our disposal in literature would supply the elements necessary for an accurate knowledge of the action of drugs. Physiology, cytology, embryology, and the more comprehensive branches of which they form part, zoology and botany, physiological chemistry, and other branches had to be ransacked for what elucidative facts they might contain. I was overwhelmed by the treasures these auxiliary departments of science contained. Clinical medicine especially proved itself, in keeping with the previously-quoted opinion of a Professor Pawlow, "a rich mine of physiological facts."

In submitting to you the briefest possible outline of the newer conception of the action of drugs my labors have suggested, I will introduce only what evidence is absolutely necessary to make my meaning clear, referring you for the rest to the two volumes of my work on the "Internal Secretions." During the balance of the hour allotted to this paper, I will lay special stress, however, upon a conclusion which appears of capital importance: that we should look to the auto-protective resources of the body, and the laws through which drugs influence them, for a scientific therapeutics. And let me add that I am no longer alone in advocating this principle. In 1903, only a few months after the first volume of my work had appeared, and before he could have learned its contents, an eminent clinician, Professor Hayem, of Paris, for instance, taught that the tendency of modern practice was to return to the views of Hippocrates, who believed in the *vis medicatrix naturae*; "therapeutic weapons are wanted," declared the French clinician, "which will reinforce the defensive power of the organism." Need I add that the entire trend of medical thought is in this direction; that the study of immunity has captivated the best minds of modern times: Pasteur, Metchnikoff, Pfeiffer, Bordet, Behring, Roux, Ehrlich and others? I am not departing from the legitimate field of sci-

ence of sound judgment, therefore, when I urge that when a disease is due to the presence of pathogenic bacteria, their toxins, toxic wastes, or any other poison, our aim should be to so enhance the defensive properties of the blood with our remedies, that the disease-breeding agents will promptly be destroyed and converted into eliminable end-products.

Granting that the remedies capable of doing this are known, we remain in the realm of empiricism unless we can ascertain how they act; how, in other words, the blood is caused by certain drugs to attack and destroy both germs and poisons. This small word "how" is a far reaching one, for it is upon our ability to meet its mandates that the standard of therapeutics as a science depends.

How then does any agent enhance the defensive powers of the body? Are we supplied with a mechanism which enables us to ward off disease—a mechanism whose activity we can enhance at will? This is the dominant problem that my labors have aimed to solve; they showed that such a mechanism does exist, and that it is built of a set of small organs regarded by Brown-Sequard as the producers of internal secretions, but the functions of which had remained obscure, namely: the pituitary body, the thyroid gland (including the parathyroids), and the adrenals which jointly form what I have termed the "adrenal system."

A brief review of the role of each of these organs is necessary before the action of drugs upon them can be define.

The pituitary body is one of those unfortunate structures which histologists and physiologists relegate to the waste basket as "vestigial organs" when they cannot explain its functions. It is fortunate, in fact, that it is located below the brain, beyond the reach of surgeons, for there would have been a holocaust of pituitary bodies just as there has been a holocaust of appendices, ovaries, etc., unless resort to surgery had been checked by the appalling results of such a procedure. Indeed when this organ is completely removed in adult animals, formidable symptoms ensue, the temperature and the blood-pressure recede; nutrition is inhibited, as shown by rapid emaciation, the intense weakness and the lowered metabolism. Dyspnea, muscular co-ordination, intercepted by convulsions, follow, and, usually on the third day, the animal lapses into coma and dies. Conversely we find the pituitary causing opposite phenomena when it is the seat of hyperemia, hypertrophy, or tumors which render it over-active. In the early stage of acromegly, for instance, the general nutrition and muscular

power are greatly increased. The overnutrition is such, in young subjects, that their stature often reaches that of giants.

The importance of the pituitary to life is further emphasized by the fact that the morbid symptoms and death caused by its removal, do not follow removal of the brain. As shown by the Cornell frog, Goltz's dog, and other examples, all the functions other than intelligence, are, after recovery, as perfectly performed as if the cerebral hemispheres were still present.

How does the pituitary so promienetly influence the temperature, the blood-pressure, metabolism, and nutrition, all functions which affect the entire organism?

Is it through the intermediary of a secretion as generally believed? Not a single proof is available in literature to show that the pituitary body secretes anything. There is ample evidence, however, contributed by such men as Cajal, Andriezen, Gentès, and others, to show, that the pituitary is connected by nerves with the base of the brain. My researches showed moreover that these nerves were the beginning of a nerve-path which passing by way of the bulb, the spinal cord, the upper sympathetic ganglia and the splanchnic terminated in the adrenals. Not only did excitation or division of this path at intervals produce the identical phenomena observed after removal, excitation or disease of the pituitary body, but the same procedures applied to the adrenals also provoked the same phenomena. Briefly I found that the pituitary body and the adrenals were united by nerves and that it was through the adrenals that the pituitary produced the various phenomena credited to it.

It becomes a question now as to how the adrenals awaken these remarkable effects.

Physiologists had been unable to discover the identity or source of an "internal secretion" shown by Bohr and other physiologists to be necessary to explain pulmonary respiration in so far as the taking up of oxygen from the air was concerned. They had admittedly also failed to find the origin of 96 per cent of the substance which distributes oxygen to all the tissues, the hemoglobin. My investigations showed that it was the secretion of the adrenals which fulfilled both these functions. Being secreted in veins which opened in the inferior vena cava, it inevitably reached the lungs; being a powerful reducing agent it necessarily absorbed oxygen on being exposed to the air of the air-cells. Moreover, the previously unidentified albuminous component of hemoglobin gave all the reactions of the adrenal secretion. A striking confirmation of the latter fact was recently contributed by Professor Mulon, of Paris,

who found that the red corpuscles gave all the reactions of adrenalin.

The manner in which the adrenals awaken the various phenomena previously enumerated may now be accounted for. As their secretion is the substance which supplies oxygen to all tissues, their removal causes a lowering of the temperature and of the blood-pressure, arrest of nutrition, emaciation, great muscular weakness, and death—precisely the symptoms that follow removal of the pituitary body, the seat of their center. Conversely it explains how adrenal extract or adrenalin raise the temperature and the blood-pressure, i. e., by enhancing oxygenation and metabolism in all tissues. The remarkable influence of the adrenals on life—in keeping with that of the pituitary body—is not only shown by the fatal effects of their removal, but also by the direct action of their products in sustaining life. As is well known, Crile, by means of injections of adrenalin in saline solution, was able to resuscitate animals fifteen minutes after all signs of life had ceased, and to keep a decapitated dog alive ten hours.

On the whole, the pituitary body through its connection with the adrenals governs the pulmonary and tissue respiration; that is to say, the life process itself.

The pituitary body regulates the functions of another set of organs: the thyroid gland and its glandules, the parathyroids. The nerves from the pituitary to these organs were discovered by de Cyon, a Swiss physiologist, who pointed out that they caused dilation of the thyroidal vessels, increasing, thereby, the functional activity of these organs.

The thyroid and parathyroids, in the light of my researches, play an important role closely related to that of the adrenals. The purpose of their secretions, acting jointly, is to increase the vulnerability or sensitiveness of all tissues, waste-products, bacteria, etc., to oxidation, by enhancing directly the inflammability of their phosphorus. In other words, it causes all these bodies to burn faster under the action of the oxygen-laden adrenal product, the albuminous hemoglobin. The efficiency of the latter, and the activity of metabolism in all tissues, is thus dependent in a great measure upon the presence of thyroid secretion of the blood. Important in this connection are the facts owing to their high content in phosphorus, all nervous elements, including the nerve-centers, are especially sensitized by thyroid extract, and that their functional activity is correspondingly enhanced. The adrenal centers being subject to this action as well as all other centers, the thyroid secretion activates metabolism in two ways: (1) by increasing the inflamma-

bility of all cells, and (2) by exciting the governing center of general metabolism, that of the adrenals.

The wonderful action of thyroid extract in cretinism now becomes self-evident: the stunted stature recalls inactivity of the pituitary (overactivity of which, we have seen, breeds giants) and inadequate secretory activity of the adrenals. Thyroid extract causes the cretin to grow rapidly. This is evidently due to increased oxygenation since the temperature previously low, now rises to normal and often beyond. There is, indeed, a greater intake of oxygen, greater output of carbon dioxide, and increased excretion of nitrogen—all proofs of enhanced metabolism. Every function, every structure, including the skin and hair, shows evidences of development and growth. The nervous system outstrips them all, however—owing to its wealth in phosphorus, we have seen; as a result the mental capacity improves, and ultimately, normal average child is evolved from the idiotic dwarf that was.

—This brings us back to the main subject of this address: therapeutics; but therapeutics relieved, in respect to the action of adrenal and thyroid preparations, and also, I may add, of iodine and its salts—of the odium of empiricism. We can now say how adrenalin, for example, acts. On entering the blood, it increases its oxygenizing power, as if a temporary exacerbation of activity of the adrenals had done so; hence its fleeting action. Of dessicated thyroid we can also say: it adds to the blood constituents of the thyro-parathyroid secretion, which not only increases the inflammability of the cellular phosphorus under the action of the blood's oxygen, but in doing so it increases incidentally the functional activity of the adrenal center, and therefore the oxidizing power of the blood. Both conditions of perfect metabolism being met the whole organism is endowed with new life when the doses are small but too rapidly consumed when the doses are large.

Moreover this furnishes the clue to the action of iodine and its salts, which although their action we have seen is admittedly unknown are so valuable in practice that as stated by Manquat, physicians use them when they are at their wits' ends. As is well known, thyroid extractives become inert when the iodine they contain is abstracted; it is at least in part to this haloid, therefore, that it owes its action. Iodine and its salts act much as do thyroid preparations, therefore—a fact confirmed in practice—but less actively, owing to the absence of the other components of the thyroid secretion, which give

them, as suggested by Notkin, the character of a ferment.

The practical feature in this connection is that thyroid extract is capable also of increasing the power of the blood to destroy germs and their toxins. Grüber long ago urged that the defensive constituents of the blood were internal secretions; Wright holds a similar view concerning the opsonins; but neither of these distinguished investigators discovered their source. Now my own researches have shown that opsonin gives the reactions of thyro-parathyroid secretion; that the oxygenized adrenal secretion, that is to say, the albuminous constituent of hemoglobin, is Ehrlich's amboceptor, and that the main constituent of his complement is trypsin, the identical ferment through which, according to Metchnikoff, phagocytes kill and digest bacteria.

The process through which a thyroid preparation increases the auto-protective activity of the blood now suggest itself: it increases directly the opsonin which sensitize what bacteria, toxin, toxic wastes, etc., may be present. By enhancing simultaneously the metabolic activity of all tissues, including the adrenal center, the pancreas and the phagocyte-producing organs, it thus endows the blood, the lymph, and the lymph glands with an excess of their bacteriolytic and antitoxic substances and cells, insures their destruction, and, at the same time, their conversion into eliminable end-products.

This introduces a feature of therapeutics which is at present absorbing the attention of the whole scientific world. How do Koch's tuberculin, Wright's vaccines, Coley's toxins, etc., produce their beneficial effects? Wright stated four years ago, referring to the protective agents of the blood, that if pathologists "knew the laws by which such substances were produced," they could "call forth a production of those substances."

I suggested several years ago that the anterior lobe of the pituitary body was not, as now believed, a secreting structure, but a sensitive organ which perceived, as it were, any poisonous substance that happened in the blood. I traced this organ throughout the entire animal scale down to such low forms as Mollusks. Zoologists having concluded that its purpose was to test the water ingested by these lowly animals for noxious substances, they gave it the suggestive name of test-organ or osphradium. My opinion that this organ exists in the higher animals was confirmed in Europe recently, Gentès having found histologically in the pituitary, a sensory structure similar to that of the olfactory membrane, a fact which suggests clearly its purpose to detect the presence in

the blood circulating over it, of any poison that it may contain, just as the organ of smell enables us to detect malodorous emanations which compromise the purity of the air.

The manner in which tuberculin and other bacterial poisons produce their effects will now appear. On entering the blood they circulate throughout the entire body, including the pituitary body and its test-organ. Now, this structure proved histologically to be the sensitive surface—in the sense that the nasal olfactory membrane is a sensitive surface—of the adrenal center, or, better, the adreno-thyroid center, from which arise both the nerve-path, which I have traced to the adrenals, and the nerves which Cyon traced to the thyroid. On the other hand, many investigators have found that during the course of infectious diseases—due therefore to bacterial toxins—the thyroid and the adrenals presented the characteristic signs of excessive functional activity, while the fact that these organs serve to destroy blood-poisons has been known ever since almost their functions have been studied.

On the whole, evidence from various directions points to the sensitive test-organ and its adreno-thyroid center as the structure excited by tuberculin, Wright's vaccines, Coley's toxins, etc., and to the adrenals and thyroid, which the adreno-thyroid center excites, as the organs which supply the blood with bacteriolytic and antitoxic substances, to which I will refer, henceforth, as "auto-antitoxin," its composition being, as I urged several years ago, the same as that of antitoxin.

The strength of this interpretation is sustained by the fact that the reaction produced by tuberculin and other bacterial vaccines corresponds with that caused by excessive functional activity of the adrenals and thyroid. No one, for example, denies that excessive oxidation underlies the production of fever, and no one will deny that fever, up to a certain limit, is a protective process but even if we grant, as Lazarus Barlow wrote recently, "that fever is beneficial, we are completely ignorant of the manner in which it acts." One can hardly realize that so commonplace a symptom should not as yet, with the enormous aggregate of scientific facts available, have been explained. The cause of this now suggests itself neither fever or any other phase of the immunizing process could be elucidated before the adrenal system, that is to say, the pituitary body, the adrenals, and the thyroid, had been found to fulfill the functions I have described, particularly oxidation.

Essential in this connection is the fact

that tuberculin and other bacterial vaccines are used as remedies. Interpreted from my standpoint: bacterial vaccines are beneficial, in a given disease, when they increase the efficiency of the body defenses in the manner described. But an important question imposes itself at this point, one bearing particularly upon the branch which interests us all, pharmacology. Can we, with our drugs, also enhance the efficiency of the defensive functions? Let me recall the fundamental principle I have previously urged, that immunizing medication is the foundation of rational therapeutics.

And this principle has borne fruit. A letter from an extremely competent and conscientious Virginia physician, Dr. C. F. Brower, received as these lines were being written, may be used to exemplify the tenor of others received: "My results are astonishing to me; and, to my assistant" (who was not as yet familiar with the newer conceptions), "they are astounding and incomprehensible." This refers to results obtained with the most familiar remedies of our pharmacopeia—to a therapeutics in which we can govern the efficiency of our defensive mechanism, just as an engineer can regulate the speed of a locomotive through the throttle valve—a therapeutics, in other words, in which our intelligence, and not empiricism, holds sway.

This does not mean of course, that our sources are limited to fighting bacteria and the effects of their toxins, toxic wastes, and other poisons. They include the use of measures to counteract insomnia, pain, and other distressing symptoms, and also morbid developments in the course of disease, such as cerebral or pulmonary congestion, paralyzes of function, etc. To make this clear, will close my remarks with a brief outline of the two or three main effects through which few groups of drugs, tonics, analgesics, hypnotics, etc., counteract these morbid phenomena, referring you to the work previously mentioned for the action of other groups, review of which would too greatly prolong this address.

A few explanatory facts are needed to facilitate your understanding of the principles I am about to submit: 1. The adreno-thyroid center, we have seen, receives the impulses it transmits to the adrenals and thyroids from the sensory test-organ, which represents, as it were, the presence of a poison in the blood, and awakens the protective reaction. To simplify the explanation of the mode of action of the drugs which evoke this defensive process in the blood, I will only mention the adreno-thyroid center, taking it for granted that you will understand that it

is the sensitive surface of this center, the test-organ, which is primarily excited by the drug. 2. Not all drugs stimulate this organ; some depress it or anesthetize it more or less actively, as will be shown presently. 3. Notwithstanding the fact that most drugs, in therapeutic doses, act primarily upon one or more centers, each drug acts specifically; that is to say, in a manner peculiar to that drug alone, or to the group of drugs to which it belongs.

In the case of one group of agents, those which provoke, through their action upon the adrenal system, the appearance in the blood of an excess of auto-antitoxin, a new term became necessary. That of "antitoxigen" appears to me to convey the intended meaning.

Antitoxigens.—The most active antitoxigens in infections and intoxications include some of the drugs now known as alteratives, the physiological action of which, we have seen, has remained obscure. Thyroid preparations are very active in this connection since they provide the blood directly, as previously explained, with an excess of opsonin to sensitize the bacterial toxins and other poisons. At the same time, by exciting the adrenal center, they incite the production of the other constituents of auto-antitoxin, and the genesis of phagocytic leucocytes. Iodine and the iodides act in the same way, but they provide less opsonin, since they only supply the thyroid and parathyroids with the main agent which enables these organs to increase their production of this sensitizing body. They are therefore far less active, in this particular, though they compensate for it, in a measure, but exciting more actively the adreno-thyroid center, thus enhancing oxidation to a greater extent. Mercury is well known in this connection, as the widespread use of calomel attests. Its salts act by exciting powerfully the adreno-thyroid center, thus providing the blood more evenly, as it were, than the two preceding agents, with all its defensive constituents. Their well known action on the liver (since this is the organ in which the antitoxic process is most active) and in infections, especially syphilis, is due to this property.

A remarkable agent in this connection is creosote, so effective in pulmonary tuberculosis and pneumonia when judiciously used. Not only does it promote the formation of auto-antitoxin and phagocytes by exciting the adreno-thyroid center, but it depresses the center which regulates the caliber of the arterioles, causing these small vessels to dilate. As a result an excess of blood is admitted into all capillaries, including those of the diseased area, and as this blood is unusually

rich in auto-antitoxin and phagocytes, the pathogenic bacteria and their toxins are vigorously attacked.

The solvent property attributed to alteratives is readily explained by the action of the opsonin or thyroid secretion which they directly or indirectly add to the blood, increased inflammability of the phosphorus contained in morbid products, gummata, for instance, rendering them more amenable to the digestive action of the auto-antitoxin. This property, when exaggerated, becomes a source of danger, when too large doses of either of the above remedies are given, since the red corpuscles and the tissues themselves may then undergo dissolution—observations borne out by the familiar terms "hemolysis" and "autolysis." Again, fever, we have seen, is due to a more or less marked increase of the auto-antitoxin in the blood, but if it exceeds 105 deg. F. to any great extent, the bacteria are not only dissolved, but the red corpuscles are also exposed to dissolution.

Tonics.—The most active of these remedies also excite the adreno-thyroid center, but only sufficiently to enhance general nutrition. Practically all these agents, however, influence another center at the same time, usually the vasomotor center. Strychnine is one of these, though it does not excite the adreno-thyroid center as actively as do mercurials, by stimulating also the vasomotor center, it causes general vaso-constriction, and by thus driving the enriched blood into the tissue capillaries increases general nutrition. The beneficial action of digitalis in heart disorders is due to a marked stimulating action on the adreno-thyroid center. It also excites, however, the sympathetic center (to be described presently), which not only governs the caliber of the arterioles, but causes these vessels to propel the blood into the capillaries, and to increase thereby the nutrition of all tissues, including the heart-muscle. Its powerful action on the adreno-thyroid center causes the adrenal secretion to be produced in considerable quantity when large doses are given; as this secretion serves also, as I urged several years ago, to aid the contractions of the right ventricle, an excess of it causes the latter to contract with greater vigor than the left, the pulse becoming dicrotic, as noted by various authors. Strophanthus, apocynum, convallaria, and other heart tonics act in a similar way, but with less vigor.

Quinine, on the other hand, acts indirectly. It does not excite the adreno-thyroid center, but the vasomotor center. In large doses it causes such violent general vaso-constriction that the blood is forced into the peripheral capillaries, the brain, the ears, the

conjunctiva, etc. Hence the headache, the tinnitus, etc. It protects against malarial infection by driving an excess of blood (including what auto-antitoxin it happens to contain) into the skin, thus augmenting the resistance to infection by the mosquito. Its curative power is due, as is well known, to its direct toxic action upon the plasmodium.

Hypnotics.—The most active of these agents, that is to say, the true hypnotics, produce their action by markedly depressing the adreno-thyroid-center. This is the action of chloral hydrate, for instance. As metabolism is thus slowed in all tissues, including the muscular elements of the arteries and veins, these vessels dilate and the blood recedes into the larger trunks, especially those of the splanchnic area. The volume of blood in the brain being reduced, sleep follows. Paraldehyde, sulphonal, and trional act in the same way, the two last-named, however, with greater violence, as shown by the cyanosis they sometimes produce—a self-evident sign of deficient oxygenation the function over which the adrenals preside. The bromides are less efficient as hypnotics; but this is because they do not depress the adreno-thyroid center when given in anything except large doses. They depress the vasomotor center and cause sleep, as does chloral, by causing general vaso-dilation and recession of blood from the brain.

Analgesics.—The cause of the prevailing obscurity as to the manner in which these agents relieve pain, is explained by the fact that the functions of the nerves through which they do so has also remained obscure. Although the vasomotor center is located in the bulb, electrical stimulation of the pituitary body, as shown by Cyon, Masay, and others, causes an immediate rise of the blood-pressure. I found that this was due to the presence in that organ of a center, the search for which had been abandoned many years: that of the sympathetic system; and moreover that its purpose was to govern the propelling power of the arterioles which admit arterial blood into all capillaries. With this fact before us the action of analgesics becomes self-evident. Antipyrin, for example, relieves pain because it excites the sympathetic center in the pituitary and hereby causes excessive constriction of the arterioles; the volume of arterial blood circulating in the sensory terminals of the diseased area being reduced, the pain ceases. That this mechanism is the true one is shown by Sawadowski's observation that a section across the basal structures, that is to say, between the pituitary and the bulb, causes antipyrin to lose its action. Acetanilid and

other coal-tar products act in the same way. So do opium, morphine, and other opiates. The hypnotic action of large doses of the latter agents is accounted for by the same process: the cerebral arterioles being also constricted and less blood circulating in the brain, sleep is produced.

Anesthetics.—These agents differ totally from either hypnotics or analgesics in the manner they produce their effects. Chloroform, by exciting violently the vasomotor center, first causes general vaso-constriction, and by thus driving at excess of blood forcibly into the capillaries of the cerebro-spinal system, produces the first stage of anesthesia, that of excitement. True anesthesia occurs when the vaso-constriction of both arteries and veins becomes sufficient to produce stasis of the blood in the cerebro-spinal capillaries, and cause it to become prematurely venous: the functions of the brain being in abeyance, sleep and anesthesia follow. The action of ether differs from that of chloroform only in that it does not excite the vasomotor center as violently. Nitrous oxide produces anesthesia by preventing the access of air to the venous blood and the adrenal secretion it contains while passing the air-cells: the adrenal secretion having failed to become oxygenized by the alveolar air, does so at the expense of the circulating blood after passing the alveoli. Hence the immediate cyanosis and the rapidity of the anesthesia, the entire cerebro-spinal system being supplied with blood deficient in oxygen.

Vaso-Cardiac Depressants.—Veratrum viride, the most important of these agents, produces its effects by depressing markedly the vasomotor center. All the vessels of the body being dilated, the blood recedes from the periphery to the deeper and larger vessels, excessive arterial tension and the resulting resistance of the blood-column to the heart's contractions are counteracted. This is the only remedy whose physiological action has, in my opinion, been known. Aconite produces its effect by depressing the sympathetic center, thus causing dilation of the arterioles and the penetration of an excess of blood into the capillary system. When large doses are given this capillary hypermia excites the peripheral end-organs of sensibility and tingling is caused, besides flushing, headache, etc.

These few examples must suffice to sustain the impression I hope to convey, that if, as stated by Professor Sollmann, therapeutic is now not even an art, but "a confusion," the painstaking labors of a host of investigators have afforded us all the factors necessary to at least elaborate a foundation for a system in which simplicity and precision supplant

confusion. Indeed, I must emphasize the fact that although the action of each drug, as I interpret it, is devoid of complexity; it is based on a vast array of evidence—all of which converges towards the solution I urge. The action of mercury, for instance, is sustained by the recorded results of 77 experimenters—to say nothing of the clinical data adduced.

Permit me to add that notwithstanding this simplified pharmacology, it is possible to select accurately the remedy that will meet the determining cause of a disease in its own field and more than ever before, counteract its morbid effects. What may we not hope when, with your aid, our knowledge, from the mere rudiments I have to offer, will have reached a high degree of perfection? Not only will therapeutics have attained its merited position as a science, but it will have raised medicine itself to so high a plane in the public estimate that no one will even think of trusting health and life to any man or woman other than a scientifically trained physician.

MISSOURI COCAINE LAW.—The Missouri law regulating the sale of cocaine is of sufficient interest to justify frequent republication:

"Section 1. It shall not be lawful for any druggist or other person to retail, or sell, or give away any cocaine, hydrochlorate or other salt of, or any compound of cocaine, or preparation containing cocaine, or any salt(s) of, or any compound thereof, excepting upon the written prescription of a licensed physician or licensed dentist, licensed under the laws of the State, which prescription shall only be filled once. Provided, that the provisions of this section shall not apply to sales in the usual quantities at wholesale by any manufacturer or wholesale dealer, when such manufacturer or wholesale dealer shall have affixed to the box, bottle or package containing such cocaine, hydrochlorate or other salt or compound of cocaine or preparation containing cocaine, a label specifically setting forth the proportion of cocaine contained in any preparation.

"Sec. 2. Every person who shall be found guilty of violation of the provisions of this act, shall, for the first offense, be fined the sum of not less than \$10 nor more than \$50, and for each subsequent offense not less than fifty dollars, nor more than two hundred dollars, or imprisonment in the county jail not exceeding ninety days, or either or both, in the decision of the court.

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THE MEDICAL FORTNIGHTLY

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EDITORIAL

WITHIN a few days the American Medical Association convenes in Chicago, the meeting will be the largest in point of attendance of any in the history of the association, but it will not have been so

The Chicago Meeting.

large as it should if every state, county and city does not send a considerably larger delegation than it has at its best. We are hoping that Missouri and St. Louis will turn out in force, and what we wish from home people we wish for all. The A. M. A. is a wonderful organization, one which should inspire admiration and pride in the hearts of medical men, those who attend its meetings feel their worth, they get from membership an impetus to good work and a feeling of fellowship with the real workers that could not be otherwise gained. Members who get from their membership only the Journal get a splendid journal, but miss the most beneficial factor of the association. Such a tremendous organization cannot be expected to be conducted to the personal liking of each and every individual of its thousands of members in each and all of its details, but in this as in other organizations, the critics are largely among the stay-at-homes. You will find but seldom a meeting so accessible as this at Chicago; you will seldom find one which offers such rich attractions of scientific and social character; you will miss an opportunity if you are not there.

SINCE the appearance in the FORTNIGHTLY a few weeks since of an editorial deploring the report that the municipal authorities were planning to abandon the pavilion type of construction in our city

Hospital Construction.

hospital group and complete the group with an eleven-story building, confirmation

of the report has materialized, and our objections have been taken up and others, with them, urged against the adoption of such an objectionable plan. The building as pictured in the daily press is utterly unlike a hospital in appearance and out of harmony architecturally with the group in which it may be placed. We do not purpose to repeat the objections mentioned before, they all still hold, and we are pleased that such able men as Drs. Tuholske, Behrens, Homan, Porter, Fischel, Nietert, Starkloff and others have taken up the matter and that the Medical Society of City Hospital Alumni is being urged to interest itself in an effort to hinder such an objectionable innovation.

In this connection an article appears in the Journal of the A. M. A. of May 9th from the pen of Dr. Wm. Osler, which is most opportune and plainly shows what the really advanced idea in hospital construction is. We wish that those responsible for the skyscraper plan would read this article and take certain points to heart. Dr. Osler finds his ideal in the matter of hospital construction in Vienna, he says:

"If anyone interested in hospitals—in every possible detail, construction, situation, general arrangements for the comfort of the patients, for the convenience of the students, for the advancement of science—if such an one wishes to have a Queen-of-Sheba sensation, let him visit the first group of the new buildings of the Allgemeines Krankenhaus. They have begun the rebuilding with the departments for women, and two of the three clinics, for midwifery and gynecology, are completed, one for Professor Schauta and the other for Professor Rosthorn, recently called from Heidelberg. About 10,000 deliveries a year take place in the three clinics, one of which is for midwives. The new clinics are exact duplicates of each other, and each has accommodation for about 200 patients. The buildings are of *four stories*, a central building with wings, built of brick and stucco, with spacious corridors, large windows, tile floors and white oil-finished walls. Inside and out they form the most attractive hospital buildings that I have ever seen. But it is not so much this aspect that gives one that sinking of the heart of which the Queen of Sheba complained when Solomon showed his treasures—it is the organization and the completeness of the arrangements for teaching and for the scientific study of disease. One large floor is assigned to students, who live in the building while attending the midwifery cases. Each clinic has its own laboratory, a special museum for teaching purposes, a library and a fully equipped

small laboratory adjoining the gynecologic operating room, so that an opinion may be given immediately as to the nature of a growth. Down to the smallest detail every case has been taken to make these two clinics the most perfect of their kind, and if the hospital is completed on this elaborate plan it will, indeed, be worthy of the fame of the Vienna school and there will be nothing like it in Europe or America. The government foots the bills, and the total cost of the two buildings has been 9,000,000 kronen (\$1,800,000)."

We hope that the profession will so forcibly express itself that the skyscraper plan may be aborted and the original plan of connected pavilions carried out.

THE milk problem is with us at all seasons of the year, but with the return of warm weather it again accentuates itself and makes its importance emphatic. It seems a strange thing that there should be such difficulty in securing pure milk in all cities, even the villages

**Pure Milk
And Clean,
Scientifically
Conducted
Dairies.**

have this problem to meet; in the large cities the matter of production is somewhat lost sight of in the greater problem of preservation between the point of production and the consumer, yet the doctor, wherever located, is vitally interested in every phase of the milk problem and should thoroughly inform himself thereon. Dr. Kenelm Winslow has recently contributed to the literature a most interesting volume on the *Production and Handling of Clean Milk*,* which every doctor should read and make his own. The book gives complete, plain, practical and authoritative instructions for the production and distribution of clean, pure milk. It is primarily purposed for farmers, health officers and inspectors who have to do with the milk supply, but we are impressed that the medical profession is so interested and so often consulted on the subject that it might very fitly have been addressed to them as well. It makes possible an intelligent advice on any phase of the subject.

It is easy enough to wonder how the demand for milk is ever met, to deplore the poorness of the milk we have to consume and to wonder why the "authorities" are not more vigilant, but isn't it surprising how much energy we can stir up over the fumigation of bank notes lest they contain germs, or how we can get exercised that some people will spit in public places, while we sit passive

knowing that a little army of infants will die this season because they were unable to have pure, clean milk. The movement which is sweeping the country bringing about prohibition in the matter of alcoholic drinks might with equal right and to even better purpose interest itself in the dairy problem, which is a menace to so many lives. The filthy dairy will exact lives here in St. Louis this summer, how many no one can tell; it will do the same in every city in the country. When you think about it seems an impossible condition.

MISSOURI VALLEY DINNER.—The annual dinner of the Medical Society of the Missouri Valley will be given at the Victoria hotel, Chicago, on Wednesday, June 3, at 6 o'clock p. m. Speakers will be present from every state within the province of this association.

DR. JOHN B. MURPHY, of Chicago, recently resigned his position as Professor of Surgery in Rush Medical College, and has since accepted the Professorship of Surgery (head of the department) in the Northwestern University Medical School, as well as the position of attending surgeon at Mercy Hospital. Dr. Weller Van Hook, who formerly held the chair of Professor of Surgery in the Northwestern University Medical School has resigned.

NINETY-SEVEN NEW PHYSICIANS.—On the evening of May 9, the Barnes Medical College graduated a class of 97 men and women, the best equipped class which has left that institution. The profession generally will regret the announcement that was made at the time that financial and other difficulties had arisen which for the time necessitate the abandonment of the proposed taking over of the institution by the State University. The Barnes will be conducted in its coming session as heretofore.

DEATH OF DR. D. C. GAMBLE.—Death has been actively making inroads to the St. Louis medical profession of late; on May 4th Dr. David C. Gamble was stricken with heart disease and died almost immediately. Dr. Gamble was a graduate of the medical department of Washington University, having graduated nearly forty years ago; he had been for some years clinical professor of otology, and had been identified with the school in its growth and advancement. Dr. Gamble was a man of strikingly clean, lovable character; his death is deplored by his confreres, his students, his patients and his many friends.

*Wm. R. Jenkins Co., Pub., New York City.

MEDICAL PROGRESS

Comprising the Regular Contributions of the Fortnightly Department Staff.

INTERNAL MEDICINE.

O. E. LADEMANN, M. D.

Epididymitis and Orchitis Complicating Typhoid.—Beardsley (*Jour. A. M. A.*, March 28, 1908) says these are by no means rare complications during a course of typhoid fever and attributes the infrequency of reported cases largely due to a popular misconception that such complications were due to a pre-existing gonorrheal infection. He details the history of four cases and bases the following conclusions on an analysis of 102 recorded cases: 1. Epididymitis or orchitis occurring during typhoid fever or during the convalescence from this disease is a comparatively rare complication, and in the majority of cases is due to infection by Eberth's bacillus. 2. These complications may be caused by other pus producing bacteria, but this is unusual. 3. The conditions may also be caused by phlebitis and thrombosis of the testicular veins, the etiologic factor being the same (bacillus typhosus). These complications may occur during the course of the disease, but they are far more likely to occur during convalescence. 4. Although the leison, as a rule, is unilateral it may be bilateral, and it may involve either the epididymis or testicle, or both, and not infrequently the cord as well. 5. Effusion into the tunica vaginalis testis is seen occasionally and there may be a urethritis with urethral discharge. Localized necrosis and suppuration, with extension of the testicular substance is an uncommon termination, the usual termination being resolution, in a week to ten days. As to treatment the author recommends the local application of cold and suitable support in a suspensory. To relieve pain opium may be resorted to. If suppuration threatens hot applications should be substituted instead of the ice bag. If pus forms, incisions and free drainage.

The Nature and Management of Diabetes.—Osborne's (*Am. Jour. of the Med. Scs.*, April, 1908) article is well written and an excellent presentation of the subject. He emphasizes that the terms diabetes mellitus and glycosuria are not interchangeable. The former should be restricted to such cases as have sugar in the urine which cannot be removed by any dietetic or medicinal treatment. On the other hand, glycosuria, while a symptom of diabetes mellitus may only be an indication of functional disturbance, alimentary, nervous, etc., although

such insufficiency in sugar metabolism, or clinically recurrent glycosuria, should be considered a danger signal, as the condition is often a forerunner of real diabetes mellitus. The author then discusses the role played by the pancreas and says, pathologically we cannot always account for the glycosuria that is present in patients who have no apparent histological disease of the pancreas. We must explain these cases on the hypothesis that there is a disturbance in the relationship between part of the secretion of the suprarenals, the secretion of the islands of Langerhans and the glycogenic function of the liver cells. If such disturbances of these secretions is permanent or unchangeable, diabetes mellitus develops. On the other hand, if the relationship of these secretions is such that diminished amount of carbohydrates or sugar can be properly metabolized without too much glucose occurring in the blood and therefore, appearing in the urine, there is a condition of sugar metabolic insufficiency only. Acetone in the urine in any amount is pathological. In starvation and in rigid proteid diet acetone may occur with perhaps diacetic acid and later oxybutric acids. There is no relation between sugar excretion and acetonuria in diabetes. It seems to be a fact, the greater the amount of carbohydrates the less acetone. The enormous appetite in diabetes mellitus is due to the inability to derive the proper amount of energy from his carbohydrate food, and consequently feels the necessity of eating more proteid and fat. If his digestive or excretory organs becomes deranged emaciation begins as he cannot take enough proteid and fat to satisfy the energy needed and ordinarily produced by carbohydrates. The increased excretion of urine is only due to the enormous ingestion of water. The tendency to dry skin and eczemas is due to the increased loss of water from the tissues. The predisposition to infections is probably due to the fact that the blood, with its increased amount of sugar, is unable normally to produce its opsonins and antitoxins. The coma in diabetes is due to an acid condition of the blood, an acidemia due principally to diacetic and oxybutric acids. Headaches, general nervous irritability and the presence in the urine of one of these acids are warnings of an approaching coma. At the same time the amount of sugar and of the nitrogen in the urine is quite likely to be diminished. The urine may also show a large amount of ammonia, probably formed by the increased acids in the urine breaking of the alkalies. An absolute withdrawal of carbohydrates from the food of patients having true diabetes mellitus will always increase the acetone and diacetic acid. Hence it is unjustifiable to

withdraw starches absolutely or too rapidly from the diet. Diabetes seems to be on the increase. The disease occurs more frequently in men than women. Heredity is an important factor. Perhaps 20 per cent of the cases show a family tendency or inheritance. The most frequent complications are those of the skin, as pruritus, eczemas, erythema, boils and carbuncles, while gangrene readily follows slight injuries to the extremities. Ulcerations of the mouth and caries of the teeth occur. There is often loss of the patellar reflexes, and much muscular debility. Ocular paralysis, cataract and retinitis frequently occur. Tuberculosis and all infections are readily acquired. The course is rapidly fatal in children, while in adults, especially if obese, in which condition the prognosis is the best, may live for years. Death is usually caused by diabetic coma. The general management of the case is essential; medicinal treatments are very secondary importance. The author's own diet consists in the removal of all starches and sugars, except bread for a time, of which he allows a liberal quantity at first, and then gradually reducing it, depending on the amount of sugar in the urine, and whether or not there is diacetic acid present. If diacetic acid does not occur and the sugar continues to diminish the bread is reduced to a minimum. If diacetic acid occurs in the urine the starches should be increased immediately until it disappears. Drugs are not to be recommended. Opium or its alkaloids succeed in reducing the excreted amount of sugar, but also succeed in producing a drug habit. For a threatening coma carbohydrates and bicarbonate of soda. For the coma itself intravenous injections of bicarbonate of soda, or normal salt solution, but here the effects are only of a transient nature.

Pulmonary Complications Following Anesthesia.—(Wight, Bull. of the Johns Hopkins Hospital, March, 1908.)—Among the complications following anesthesia discussed by the author are lobar pneumonia, broncho-pneumonia, bronchitis and pleurisy. The lobar pneumonia ordinarily resulting from anesthesia differs from that commonly seen in the medical wards in the respect that the temperature is usually lower and of a more irregular type, the duration is shorter and a true crisis is seldom, complications are less liable to occur, the focus is central, the pulmonary signs are late in developing, the cough is mild and the sputum rarely blood tinged. He enumerates the following factors which play a role in the production: 1. Irritant action of anesthetic, ether is the most irritant, chloroform the least. 2. Aspiration

of mucus and vomitus and hypersecretion of mucus. The preanesthetic administration of atropin he regards as valueless. 3. Embolic; that these constitute a factor is doubtless true, but other factors must bear part. 4. Toxic effect of anesthetic on heart and blood vessels; chloroform is the most dangerous. 5. Presence of pneumococci and other bacteria in the mouth and throat. Extension of infection through subdiaphragmatic space. 7. Cooling of the body; a loss of temperature from half to one degree may follow prolonged anesthesia without any other factor, but the cold table, wet towels about the site of incision, irrigating solution, and other conditions under the surgeon's control, are sometimes responsible. 8. Limitation of lung expansion. 9. Lessened resistance of the patient. Prevention lies in disinfection of the mouth and nose as a routine measure, and administration of the anesthetic by the open drop method with the head low and to one side, and the jaw kept forward. The patients must be kept warm and dry by warm pads, jackets and leg covers. Patients should be warmly covered on removal from operating table to bed.

OPHTHALMOLOGY.

W. E. FISCHER, M. D.

History of a Case of Subretinal Cysticercus.—(F. Lopez, *Annals of Ophthalmology*, Oct., 1907.)—A physician's wife complained of a slight shadow in her visual field. There was a small scotoma below and temporally which gradually increased in size. The ophthalmoscopic examination by the inverted image revealed a small yellowish white spot below and outside of the papilla, by the direct examination it proved to be situated immediately above and to the nasal side of the optic disc, forming a protrusion above the retina. The patient had eaten ham and canned meats shortly before her ocular disturbance began. The disease progressed rapidly in two months; central vision became impaired, the retinal artery over the vesicle burst enveloping the vesicle almost completely in a hemorrhage. The cysticercus was removed under chloroform anesthesia. The upper and inner meridian was chosen for the site of the incision, after tenotomizing the superior oblique and rotating the eye downward an incision 1 cm. long was made in the sclera in a meridian immediately to the inner side of the vertical. Adrenalin solution was employed to prevent hemorrhage. The cysticercus was delivered with a Levis spoon, prolapse of vitreous or intraocular hemorrhage did not complicate the operation. The first dressing as a binoc-

ulus and was changed on the tenth day. The operated eye was left open two weeks later. The central visual acuity improved to the counting of fingers. The cysticercus belonged to the *tenia solium*. The early surgical treatment of this unusual condition is emphasized.

The Treatment of Interstitial Keratitis.—(H. H. Martin, Jour. A. M. A., April 11, 1908).—During the stage of infiltration and vascularization, local measures with the exception of those employed in the alleviation of symptoms and complications are practically valueless. Iodides in this phase of the disease given as a routine practice are often not beneficial, but even injurious. Mercury seems to be the sovereign remedy administered preferably in the form of inunctions as hypodermic injections are disagreeable to children. Inunctions are given on alternate nights after a hot soap and water bath, and need not be confined to one portion of the body, but are distributed over a large area with gentle rubbing for a period not longer than fifteen minutes. The process should be repeated as the symptoms of mercurial saturation indicate. In children under 10 years of age the initial dose is 10 grains, increased to 15 or even 20. In children over ten years of age and in adults the initial dose is from 10 to 30 grains, increasing to 60 in adults and from 20 to 30 in children. This is continued until the progressive stage has subsided when, after an intermission of two weeks the inunctions are rested beginning at the initial dose and increasing to one-half of the maximum dose administered during the inflammatory stage. If there is no tendency to recurrence the iodide of iron may be added to the mercurial treatment. The patients should not be confined to their rooms, and should be given a good wholesome diet, consisting principally of milk and eggs. The local conditions will be relieved by the use of atropine, hot applications and leeching. The inflammatory deposits in the cornea will usually clear up under the constitutional treatment; however, the employment of subconjunctival saline injections, the ointment of yellow oxide of mercury and dusting of calomel into the conjunctival sac will facilitate resorption in some cases. The patients should be kept under surveillance at least six months.

An Illuminated Eye Spud and Needle.—(R. L. Carson, Jour. A. M. A., May 9th, 1908.)—The instrument was devised to enable the operator to remove a foreign body from the cornea or perform a discission for post-operative cataract without the assistance of a third hand for the concentration of light on the

field of operation. A small electric lamp is attached near the end of the handle of the instrument in a manner that the tip of the instrument is in the center of the circle of light emitted by the lamp.

Double Perforation of the Eyeball by Metallic Foreign Bodies.—(E. A. Shumway, *Annals of Ophthalmology*, Oct., 1907).—An American machinist, 39 years of age, was injured by a chip of iron penetrating the cornea of his eye. An X-ray photograph revealed an irregular foreign body which appeared to be in the posterior portion of the eyeball. Efforts to extract with both the Giant and Hirschberg's hand magnet were futile. Subsequent X-ray photographs showed the foreign body to be located behind the eyeball. Two weeks after the injury the patient suffered intense pain and as the eye was blind and had become very prominent it was enucleated. The chip of iron was found in the exact locality indicated by the chart. The foreign body was surrounded by an extreme edema, the tissues having the consistency of cartilage. The patient made an uneventful recovery. The case is instructive in many ways, it demonstrates clearly the necessity of localizing foreign bodies clearly and accurately.

SURGERY.

Bismuth Treatment of Sinuses, Etc.—(E. G. Beck, Chicago (Jour. A. M. A., March 14), describes the method of treating and diagnosing fistulous tracts, tuberculous sinuses and abscess cavities by bismuth paste injections and radiography, which he has used since March, 1906. He gives the formulas for the material used as follows: Formula for diagnosis and early treatment: **B** Bismuth subnitrate, 30 grams; vaselin, 60 grams. Mix while boiling. For late treatment, Bismuth subnitrate 30 grams; white wax and of paraffin, of each 5 grams; vaselin, 60 grams. Mix while boiling. The soft paraffin, unlike hard paraffin, is absorbed in the tissues, and the bismuth, being opaque to the X-ray, gives a shadow that shows the shape and ramifications of the cavities. In making the injections, he first dries out the cavity, if possible, by packing with plain gauze, which is removed just before the injection. The emulsion is sterilized before using, and is injected hot and liquid from a sterilized syringe. The first case injected for diagnostic purposes suggested the value of the method for curative purposes also; after one injection of the bismuth paste the psoas abscess fistula of nearly two year's standing closed up entirely and remained

closed. Subsequent experience confirmed its value. Beck thinks it probable that the bismuth, which becomes radioactive on exposure to the X-rays, promotes the formations of granulations where it comes in contact with the walls of the cavities, and to increase this effect, in some cases, he has added strontium salicylate. Eleven cases are reported, and the author's conclusions are summed up as follows: "1. A successful surgical operation on fistulous tracts depends principally on the exact knowledge of the extent and direction of the sinuses before the operation is undertaken. 2. Radiographs taken after the fistulas have been injected with bismuth paste show the extent and direction of the fistulous tract. 3. Skiagraphs of all fistulous tracts should be taken before an operation is decided on. 4. Fistulous tracts, tuberculous sinuses or abscess cavities, including empyema, can be cured by injection of bismuth paste. 5. Cavities or fistulas should be as clean and as dry as possible before the injection of bismuth paste. 6. The bismuth paste, when mixed with wax or soft paraffin, and injected in a liquid state, solidifies in the fistula and serves as a framework for new connective tissue. The paste is absorbed and the fistula obliterated. 7. Bismuth paste injection will not heal out sinuses where sequestra are present, these must be removed before injection. 8. The bismuth paste injections are painless and produce no unpleasant or dangerous symptom."

A Rational Method of Treatment in Chronic Endometritis.—Joseph H. Rector of Jersey City (Med. Rec., March 28) describes his method of treatment of chronic endometritis. It consists of free drainage of the organ and of its mucous glands with irrigations with various solutions. Preliminary dilatation is produced by the use of a mild galvanic current applied with an intrauterine electrode, and followed by irrigation with galvanization. The current must be even and uninterrupted and the negative electrode is applied in the uterus. The galvanic current produces direct cellular stimulation, of muscular, glandular and secretory structures. Simple catarrhal endometritis produces a watery discharge, while the involvement of the cervix renders it thick and ropy. Proper treatment involves cleansing, opening the mouths of the glands, stimulating glandular activity, and replacing the normal equipoise between vascular supply, innervation, and mutual relationship. All these are accomplished by galvanic irrigation.

Transplantation of Blood Vessels.—C. C. Guthrie, St. Louis (Jour. A. M. A., March 28), describes the changes ascertained to

occur in the structure of transplanted veins and arteries. When blood vessels, e. g., the carotids, are anastomosed end to end in situ, practically no change occurs. If the central end of an artery is united to the peripheral end of a vein, there is usually some change in both, evidenced by a decrease in the thickness of the vessel wall in the artery and an increase in the vein. Still more marked histologic alterations occur when rapid transplantations of segments of either arteries or veins are made in animals of the same species, as well as in heterotransplantations, only a short period of anemia of the segment occurring. Ordinarily this consists of dilatation of the lumen and thickening of the wall, the latter being largely due to the increase of fibrous tissue. The appearance of the vessel may be notably changed, as well as its histologic structure, and yet the mechanical function be preserved. Two important factors must be considered in accounting for the changes in even simple anastomosis, viz.: (a) change of pressure in the lumen of the vessel, and (b) alteration of the circulation in the vasa vasorum. In case of rapid transplantation of a segment in the same animal three other factors must also be considered, viz.: (c) complete abolition of the circulation in the nutritional capillaries; (d) complete abolition of the lymphatic circulation, and (e) complete severance of nervous connections, while in case of isotransplantations or heterotransplantations still another factor must be added: (f) in the former the possible and in the latter the probable toxicity of the host's body fluids for the segment. The question arises whether the cells of the blood vessels actually survive, and by their growth and multiplication account for the histologic changes observed; or do they, to a greater or less extent, perish, and only serve as a bridge for the ingrowth of other cells, after which they suffer degenerative and absorptive changes? Whatever may be the possibilities under some conditions, it is hardly conceivable that any of the cells in a transplanted formaldehyd-fixed segment could survive, yet after a considerable interval it performs the mechanical function required of it and does not greatly differ macroscopically from what would be expected of a fresh segment similarly transplanted. Guthrie says that, unfortunately, premature conclusions seem to have been drawn concerning the survival of the cells of such transplanted segments. The question may be of no practical importance, but it is of much importance in a scientific point of view. The problem is a very complex one, and until a great deal more is learned conclusions and generalizations are not justified.

MEDICAL MELANGE.

As a "helper out" to the prophylaxis campaign against infectious diseases in San Francisco, a corps of 200 inspectors and rat catchers has been organized, a bounty being paid for the number caught.

THE antivivisection move is even arousing Paris, and in consequence thereof on March 5th, a large public meeting was held under the direction of the International Antivivisection Union to demand restrictive legislation against reported brutalities of vivisection. Many prominent members of the different organizations of antivivisection were present.

ST. LOUIS MEDICAL REVIEW LABORATORY BUREAU.—The St. Louis Medical Review announces that it has opened a Laboratory Bureau in the Metropolitan Building, Room 74, under the direction of Warren P. Elmer, M. D., and R. L. Thompson, M. D. Adequately equipped for all Clinical and Pathological Examinations that will be of service to surgeons and physicians.

ALUMNI SOCIETY INCORPORATED.—Application has been made in the circuit court for a pro forma decree of incorporation by the Medical Society of the City Hospital Alumni of St. Louis. Dr. William E. Sauer is president of the organization; Dr. Louis H. Hemplemann, vice-president; Dr. William H. Luedde, secretary; Dr. E. Lee Dorsett, treasurer, and Drs. Louis H. Behrens, John C. Falk and Louis J. Oatman are directors.

JOINT MEDICAL COUNCIL ELECTION.—On April 3 the St. Louis Joint Medical Council elected the following officers: Chairman, Dr. John C. Morfit; vice-chairman, Dr. Bransford Lewis; secretary-treasurer, Dr. John Green, Jr., and auditor, Dr. L. Claude McElwee. The council is vigorously pushing the question of doing away with the present antiquated method of municipal hospital control and substituting an organization in keeping with that the modern ideas of hospital management.

PRACTICAL EXAMINATION OF PHYSICIANS.—At a special meeting of the Illinois State Board of Health, held April 5, the board, by a formal resolution, approved of the proposition to subject all physician applicants for a state license, to a practical examination covering one day, in addition to the written examination, which requires three days for completion. Owing to press of work the details were not arranged, but it is probable that the plan will be put in operation with the October (1908) examination.

INTERNATIONAL CONGRESS ON TUBERCULOSIS.—An excursion is planned for September to attend the Congress on Tuberculosis at Washington, D. C. The arrangements are in the hands of Dr. Chas. Wood Fassett, of St. Joseph, to whom communications should be addressed.

ALBUQUERQUE, NEW MEXICO, has been selected as the site for great hospital for the treatment of tuberculosis, to be built by the the general organization of the Presbyterian Church of the United States at a cost of \$1,000,000. This is the third of the sanitariums to be built in this country. Albuquerque gives a site and a considerable sum of money toward the institution.

ADVERTISING SPECIALISTS TO BE PROSECUTED.—It is announced that the prosecutor of the city of Chicago will undertake to prosecute those physicians and business houses that advertise cures for certain diseases and weaknesses. According to the ordinance, fines vary from \$25 to \$200 for conviction in such cases. St. Louis has laws quite as specific in detail, but it seems impossible to interest the municipal officials in their enforcement.

ANTI-TUBERCULOSIS WORK IN COLUMBUS.—Weekly schools are held at the Columbus, O., Tuberculosis Dispensary in which members of families where the disease has taken hold are instructed in the proper sanitation of their homes, and the care of those unfortunate members which have been afflicted. Much for the future usefulness of the society depends upon the success of their project to erect a tuberculosis home through an appropriation by the county. This has already been authorized, and plans will probably be decided upon at a meeting to be held with the county commissioners.

CHICAGO PHYSICIANS AND DRUGGISTS FRACTIONALIZE.—The Evanston Branch of the Chicago Medical Society recently held a joint meeting with the druggists of the vicinity, at which there was a profitable discussion of nostrums, counter prescribing, incompatibilities and other matters of interests to both professions. The resolutions suggested by Professor Hallberg concerning prescribing by druggists were adopted. After this meeting there was organized the Evanston and North Shore Pharmacological Society for the purpose of studying the composition, preparation and action of drugs. Licensed physicians and registered pharmacists of Cook County, north of Chicago, are eligible for membership. A banquet was held in Evanston, April 9, to assist the members of the two professions in getting better acquainted.

THE MORTALITY OF NEW ORLEANS.—During the month of March, 1908, there were 633 deaths reported from all causes, 386 white and 247 colored. The annual death rate in 1,000 of population was 17.91 for the white population, 31.87 for the colored, and 21.64 for the total white and colored. There were 48 still births.

DENTISTS OF THE U. S. ARMY.—The dentists of the United States Army are anxious to be established as a department of the army with permanent locations. They are now hurried from America to the Philippines, to Panama, to Cuba, to Alaska and all parts of the United States on a moment's notice and there is no apparent head to the dental service. Attorneys representing the dentists are now in Washington in consultation with congressmen and senators, endeavoring to secure legislation which will provide for a dental department having similar rules and regulations as now pertain to the medical department.

MEDICAL EMERGENCIES.—The National Volunteer Emergency Service instituted in 1900, has recently been re-organized by the election of Dr. James Evelyn Pilcher, the distinguished editor of *The Military Surgeon*, as its Director General, and Dr. F. Elbert Davis, of New York, as its Adjutant General. Its work will be conducted along military lines, the details being worked out in three separate Corps, a First Aid Corps, a Public Health Corps, and a Medical Corps the latter consisting of physicians, with rank from lieutenant to colonel, according to length of service, to whom are afforded special opportunities for emergency training. It includes among its personnel a large number of notable personages, and is rapidly extending its membership throughout the country. Full details regarding the service and its great work may be obtained by addressing Director General Pilcher at Carlisle, Pa.

THE COLLOIDAL FORM OF THE CASEIN OF MILK.—It is becoming more and more apparent that the successful feeding of cow's milk to infants and invalids is dependent, in largest measure, upon the physical condition of its casein. Until recently it has been assumed that the casein was in solution, but the researches of Hammersten and others have clearly shown that such is not the case. Casein is present in milk as calcium-casein, and is in suspension in a colloidal or jelly-like form. This is proved by the fact that if milk be filtered through porous clay, the caseinous matter does not pass through like the other albuminoids, which are in true solution. When chemical modifiers are used with

milk the physical condition of the casein is changed. Such a change is objectionable for a number of reasons. The colloidal casein in milk serves several functions: First, it keeps the fatty globules of milk in a state of emulsion, and second, it presents a form of food that requires work for its digestion. Naturally, when chemical modifiers are used with milk, its physical form is disorganized, and, coming in contact with gastric juice, the casein is precipitated in more or less tough and cheesy curds that are most difficult of digestion. Not only this, but the fatty globules being no longer surrounded by colloidal material, tend to coalesce, forms masses of fat, and cause fatty indigestion. When, however, mechanical modifiers are used with milk, such as the cereals contained in Eskay's food, the insoluble or gelatinizable starch of the cereals takes the place of the colloidal form of the casein in the milk, and not only presents the coalescing of the fat, but also, mechanically breaks up the casein into fine flakes (instead of tough and cheesy curds) that are most easily digested. It is for these reasons, chiefly, that Eskay's food is of much supreme value as a milk modifier. It does not change the chemical character of the milk, but it adds a colloidal material in the form of gelatinizable starch, that takes the place of the colloidal casein, when the latter is disorganized or decomposed by the gastric juice, and performs the same physical functions, thereby minimizing the possibility of fatty indigestion, and making proteid-digestion most easy.

COMING MEDICAL MEETINGS.

National Meetings

- American Medical Association, Chicago, June 2-5, 1908.
- American Association of Medical Examiners, Chicago, June 1-2, 1908.
- American Gastro-Enterological Association, Chicago, June 1-2, 1908.
- American Urological Association, Chicago, June 1, 1908.
- Association of American Teachers of the Diseases of Children, Chicago, June 1.
- International Congress on Tuberculosis, Washington, D. C., September 21 to October 12.
- Mississippi Valley Medical Association, Louisville, Ky., October 13-15, 1908.
- Medical Society of the Missouri Valley, Council Bluffs, Iowa, Sept. 3-4, 1908.
- Medical Association of the Southwest, Kansas City, Mo., October 20-21, 1908.
- National Association for Study and Prevention of Tuberculosis, Chicago, June 5-6.

State Meetings

- Colorado, Denver, October, 1908.
- Idaho, Boise, October 8-9, 1908.
- Indiana, French Lick, June 18-19.
- Kentucky, Winchester, October.
- Michigan, Manistee, June.
- Minnesota, St. Paul, October.
- Nevada, Goldfield, October 6-7.
- New Mexico, Albuquerque, October.
- Ohio, Columbus.
- Oregon, Portland, July.
- Washington, Walla Walla, September 2-4.
- Wisconsin, Milwaukee.
- Wyoming, Sheridan.



THE MEDICAL FORTNIGHTLY

A Cosmopolitan Biweekly for the General Practitioner

The Medical Fortnightly is devoted to the progress of the Practice and Science of Medicine and Surgery. Its aim is to present topics of interest and importance to physicians, and to this end, in addition to a well-selected corps of Department Editors, it has secured correspondents in the leading medical centers of Europe and America. Contributions of a scientific nature, and original in character, solicited. News of Societies, and of interesting medical topics, cordially invited.

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Contributions and books for review should be addressed to the Managing Editor, 319 and 320 Century Building, St. Louis, Mo.

FAVORITE PRESCRIPTIONS

PYELITIS.—Robin prescribes the following pill in inflammation of the mucous membrane of the pelvis of the kidney:

R Venice turpentine..... 3iiss
Camphor..... 3iiss
Extract of opium..... gr iv
Extract of aconite..... gr ii

M. ft. pil. LX.

Sig.: One pill two or three times a day.

HEMORRHOIDS.—A formula which has been found very useful, is as follows:

R Fld. ext. hamamelis..... 3j
Fld. ext. hydrastis,
Tinct. benzoin comp.....aa 3ss
Tinct. belladonna..... 3j
Linseed or olive oil, carbol (5 per cent).....q s ad 3iij

M. Sig.: Apply often to the parts.

Hot or cold applications are often of service.

CATARRHAL PHARYNGITIS.—

R Sodii biborat..... gr. xlv
Resorcini..... gr. xxx
Glycerini..... 3j
Aq. menth. pip.....ad. 3vj

M. Sig.: For local application.

R Pot. iodidi..... gr. xxx
Iodi..... gr. v
Mentholis..... gr. iiss
Glycerini..... 3j

M. Sig. For local application.

R Acid carbolic..... 3iij
Resorcini..... gr. xv
Glycerini..... 3j
Aq. menth. pip..... 3iiss
Aquae.....ad. 3vijj

M. Sig.: Use as a gargle.—Med. Record.

FOR ASTHENIC DYSPEPSIA.—The following aromatic bitter tonic is recommended in Bulletin generale de therapeutique:

R Tincture of cardamom..... 3ij
Compound tincture of rhubarb.... 3ij
Sodium bicarbonate..... 3j
Infusion of calumba.....ad. 3iv

M. Sig.: Dessertspoonful three times a day.—N. Y. Med. Jour.

MERCURIC BROMIDE IN SYPHILIS.—Dalmier finds, after several trials, that the best solution for use, as an intra-muscular injection in syphilis, is:

R Hydrarg. bromidi..... gr. viij
Sodii bromidi..... gr. vj
Aq. destill. steril..... 3i

M. Fiat inject.

This injection is painless and effective in action.—Revue de therapeutique.

LEAD COLIC.—

R Powd. opium..... gr. $\frac{1}{4}$
Ext. belladonna..... gr. $\frac{1}{12}$

One such pill every two hours for 24 hours.

At the same time, the following purgative should be given and repeated in twelve hours:

R Sodium sulphate..... 3iv
Magnesium sulphate.....
Syr. raspberry.....aa 3i
Aq..... 3vijj

FOR PERSPIRING FEET.—Excessive perspiration of the feet can be checked by painting with a 5% solution of picric acid in 90% alcohol, beginning with one application a day, and later on using the solution once a week. After the solution has dried, the feet are powdered with a mixture of the following composition:

Thymol iodide..... 2.5 grams.
Alum. naphtholsulphonate 2.5 grams.
Picric acid..... 2.5 grams.
Bismuth subgallate.....15.0 grams.
Talcum.....50.0 grams.

—Deutsch. Amerik. Apoth.-Ztg.